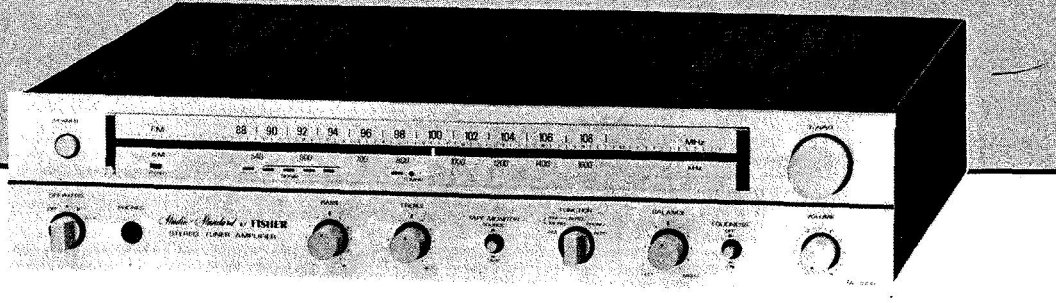
SERVICE MANUAL

FISHER

TA-3000

AM/FM Stereo Tuner Amplifier

(EUROPE)



The first name in high fidelity

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SPECIFICATIONS

AM/FM STEREO TUNER AMPLIFIER		TA-3000
FM SECTION		
Tuning Range		87.5 – 108 MHz
DIN Sensitivity (75 ohms)	Mono	1.5 μV
	Stereo (50 dB)	38 μV
Limiting Sensitivity (75 ohms)		0.8 μV
Muting Threshold (75 ohms)		5 μV
S/N Ratio (DIN)	Mono	70 dB
	Stereo	65 dB
T.H.D. (at 1 kHz)	Mono	0.2 %
	Stereo	0.5 %
Frequency Response (20 Hz - 15 kHz)		±1 dB
Stereo Separation (1000 Hz)		42 dB
Sub-Carrier Suppression (19/38 kHz)		42/55 dB
Selectivity (DIN) ±300 kHz		65 dB
Capture Ratio		1.0 dB
Spurious Rejection		–75 dB
AM Suppression		60 dB
IF Rejection		70 dB
Image Rejection		50 dB

SPECIFICATIONS (Continued)

AM SECTION		
Tuning Range		520 – 1605 kHz
Sensitivity		300 μV/m
S/N Ratio (DIN)		60 dB
T.H.D.		0.5 %
Frequency Response		50 Hz - 1.8 kHz
Selectivity (±9 kHz)		40 dB
Spurious Rejection		52 dB
IF Rejection		40 dB
Image Rejection		40 dB
PRE MAIN AMPLIFIER SECTION		
Continuous Power	at 1000 Hz (8 ohms)	2 x 24 W
	40 Hz - 20 kHz (8 ohms)	2 x 20 W
T.H.D. (Rated Output, 8 ohms)		0.1 %
I.M. (Rated Output, 8 ohms)		0.1 %
Damping Factor (8 ohms)		40
Power Bandwidth		10 Hz - 50 kHz
Frequency Response (at 50 mW)		40 Hz - 20 kHz, ±1 dB
Input Sensitivity and Impedance		
	PHONO MM	2.5 mV/50k ohms
	AUX	150 mV/100k ohms
	TAPE	150 mV/100k ohms
	TAPE (DIN)	150 mV/100k ohms
Treble Control 10 kHz		±10 dB
Bass Control 100 Hz		±10 dB
Loudness (at –30 dB) 100 Hz/10 kHz		+8 dB/+4 dB
Output Voltage and Impedance		
	TAPE	150 mV/200 ohms
	TAPE (DIN)	4 mV/10k ohms
	HEADPHONES	5V/100 ohms
Crosstalk (at 1 kHz)	PHONO	65 dB
	AUX	65 dB
S/N Ratio (DIN)	(at Rated Power) AUX	100 dB
	(at 50 mW) AUX	60 dB
GENERAL SECTION		
Power Requirements		AC 110/220 V, 50/60 Hz
Power Consumption at Rated Power		120 W
Dimensions (W x H x D)		440 x 89 x 330 mm
Weight (approx.)		5.7 kg

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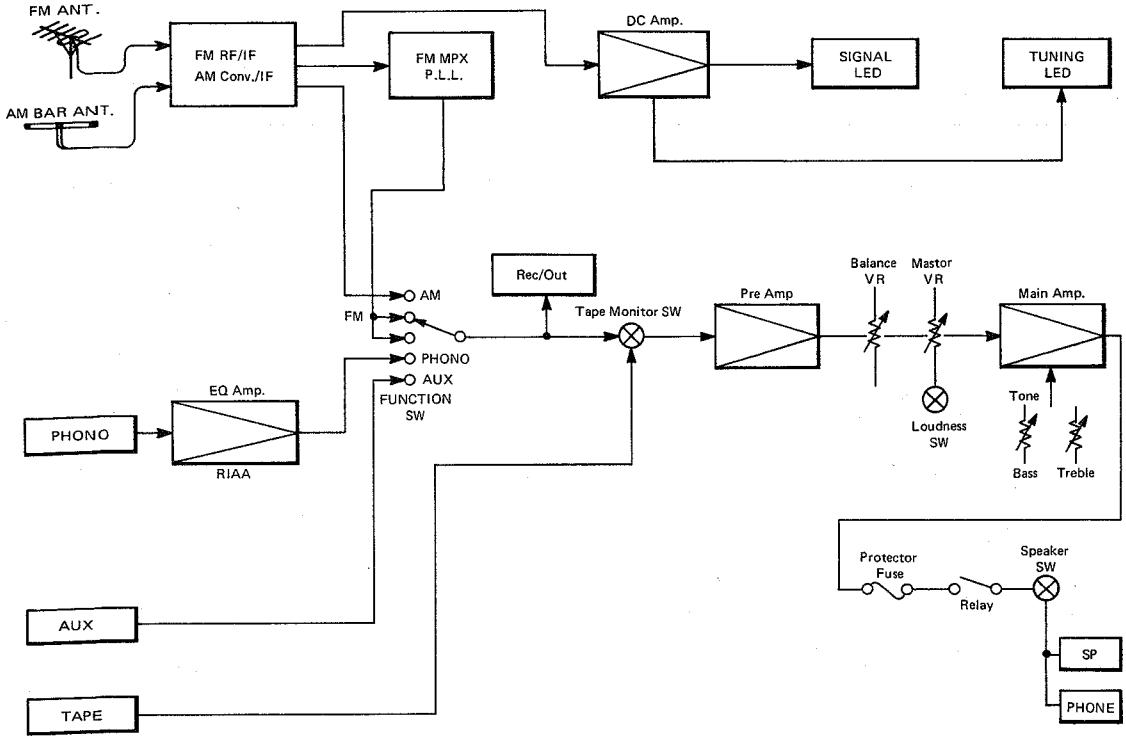
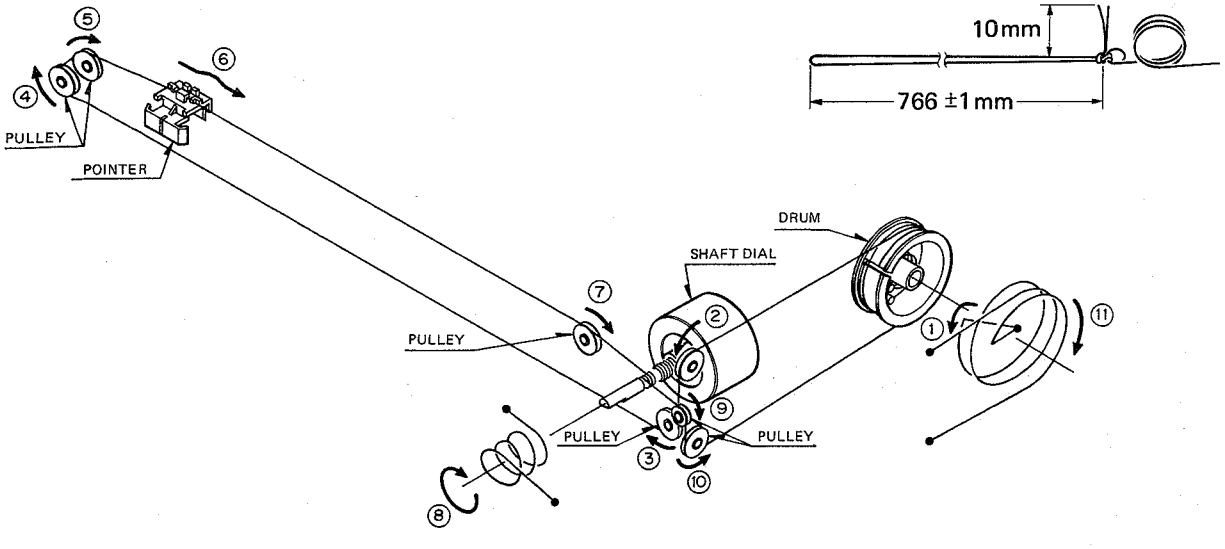
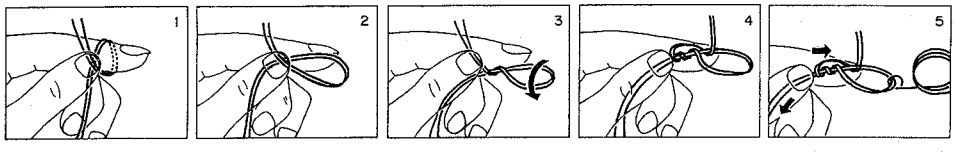
FUNCTIONAL BLOCK DIAGRAM



DIAL CORD STRINGING



CORD KNOTTING



NOTE: Check to see that the dial cord is correctly strung by turning the dial.

RECOMMENDED TEST EQUIPMENT

The following test equipments are recommended to completely test and align the Amplifier:

- Line Voltage Isolation Transformer
- AC DC Multimeter.
- Accurately Calibrated AC Voltmeter.
- Oscilloscope (Flat to 100 kHz Minimum)
- Low-Distortion Audio Sine-Wave Generator
- Harmonic Distortion Analyzer
- Two (2) Load Resistors 8-ohms, 250 Watts (Minimum Rating)

HARMONIC DISTORTION TEST

CAUTION: Limit the following tests to no more than ten minutes each. Use 8-ohm resistors, with a minimum power rating of 250 watts when connecting a load across the SPEAKERS terminal.

CONTROL SETTINGS:

Unplug the AC power cord and set the front panel controls as follows:

- BASS, TREBLE, and BALANCE controls to center positions.
- POWER switch to OFF
- SPEAKERS switch to OFF
- FUNCTION switch to AUX
- TAPE MONITOR switch to SOURCE
- LOUDNESS switch to OFF
- VOLUME control to MINIMUM position
- LEFT CHANNEL DRIVEN

ONE CHANNEL DRIVEN:

1) Connect a low distortion audio generator to LEFT AUX IN jack. Set generator frequency to 1 kHz and output to minimum.

2) Connect an 8-ohm load resistor between SPEAKERS A LEFT and COM terminals. Connect a Harmonic Distortion Analyzer and an AC VTVM in parallel across the 8-ohm load.

3) Connect the AC power cord and set SPEAKERS switch to A. Turn VOLUME control to MAX.

4) Increase generator output for 24 Watts RMS (13.8 V across the 8-ohm load). Harmonic Distortion Analyzer should measure 0.1 % distortion or less.

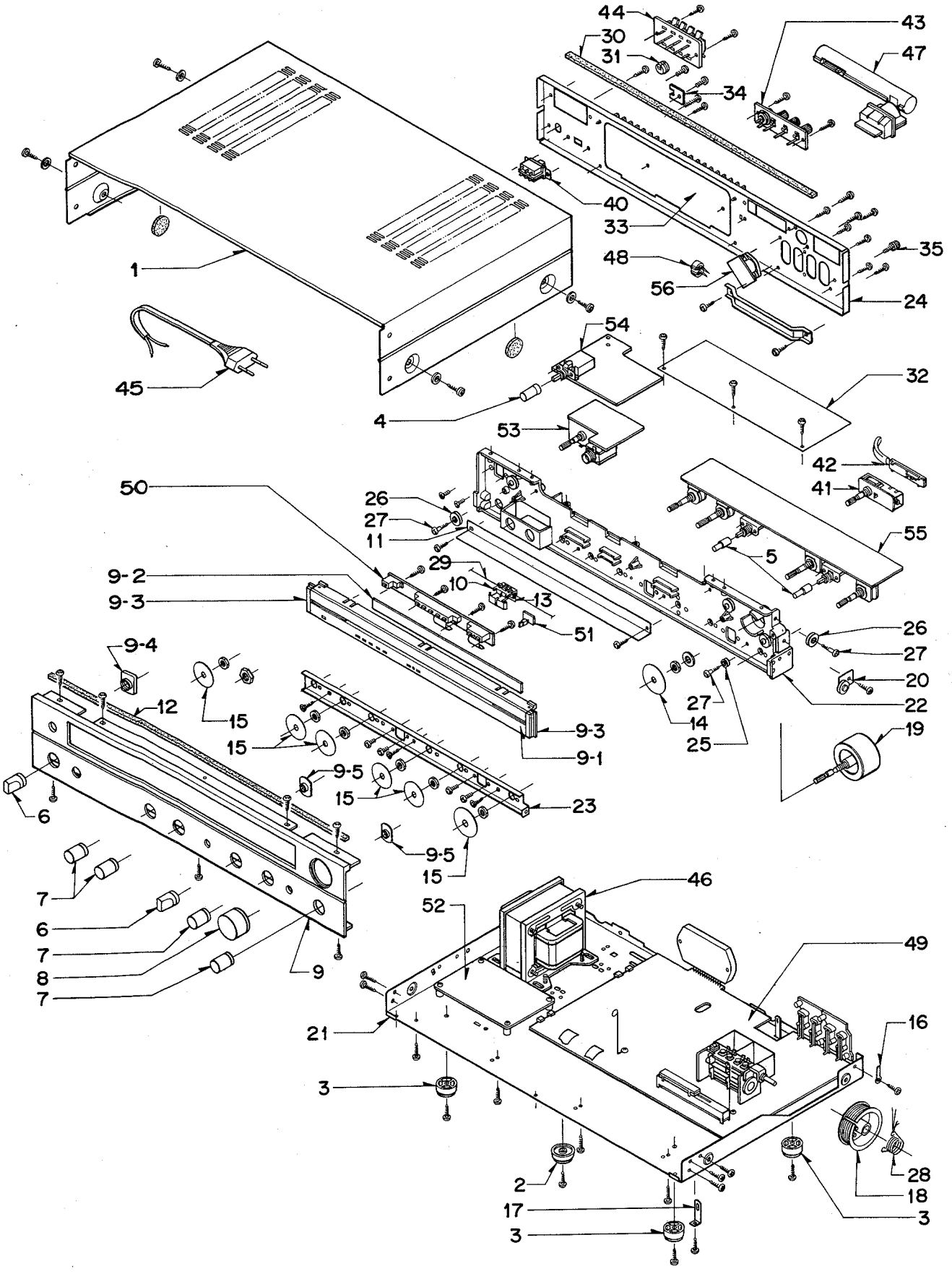
5) Repeat steps 1 through 4 for RIGHT CHANNEL.

BOTH CHANNELS DRIVEN

Connect 8-ohm load resistors across LEFT and RIGHT MAIN SPEAKERS terminals. Adjust generator output and "BALANCE" control for 24 Watts at Left and Right Channels (13.8 volts across the 8-ohm loads). Harmonic Distortion Analyzer should measure 0.1 % distortion or less at each channel.

CAUTION: This precision high-fidelity instrument should be serviced only by qualified personnel, trained in the repair of transistor equipment and printed circuitry.

CABINET & CHASSIS EXPLODED VIEW



PARTS LIST

PACKING PARTS LIST

Ref. No.	Parts Number	Description
	131 6 1139 82802	Box Corrugate-EXP
	131 6 2119 02091	Bag Polyethylene-EXP
	131 6 3009 29440	Pad (Right, Left)
	131 6 3009 30090	Pad (Antenna Cover)
	131 6 3009 30790	Pad (Inner)

ACCESSORIES PARTS LIST

Ref. No.	Parts Number	Description
	4 2449 20230	Antenna FM
	131 6 4119 84101	Explanatory Booklet
	131 6 4519 15700	Guarantee Certificate

CABINET PARTS LIST

Ref. No.	Parts Number	Description
1	131 2 1410 22900	Cover
2	131 2 1801 12900	Leg, Rear (Left)
3	131 2 1801 14100	Leg
	131 2 1801 13900	Felt, Cover (Both Inside)

APPEARANCE PARTS LIST

Ref. No.	Parts Number	Description
4	131 0 1001 53000	Knob (Power Switch)
5	131 0 1001 53300	Knob (Loudness, Tape Monitor)
6	131 0 1001 55200	Knob (Function SP Select)
7	131 0 1001 55400	Knob (Bass, Treble, Balance, Microphone)
8	131 0 1001 57200	Knob (Tuning)
9	131 0 1016 36201	Panel Decorate Assy
	131 2 1203 50101	Panel Control
9-1	131 2 1201 35501	Plate Dial
9-2	131 2 1205 24000	Decorate Plate Dial
9-3	131 2 1311 44800	Sash
9-4	131 2 6111 12600	Bushing (Power Switch)
9-5	131 2 6111 22200	Bushing (Push Switch)
10	131 2 4101 21800	Pointer
11	131 2 4120 12801	Slide Rail Pointer
12	131 2 5205 15300	Cushion (Panel Top)
13	131 2 5205 24000	Cushion (Pointer)
14	131 2 6113 31800	Shelter
15	131 2 6113 36900	Shelter

CHASSIS PARTS LIST

Ref. No.		Parts Number	Description
16		4 2379 21520	Terminal Lug 1P
17		4 2379 21530	Terminal Lug 1P
18		131 0 3002 11300	Drum Assy
19		131 0 3003 21900	Shaft Dial Assy
20		131 0 3020 10200	Pulley Assy
21	*	131 2 3301 26700	Chassis
22	*	131 2 3305 28400	Panel Front (Plastic)
23	*	131 2 3305 28500	Panel Front
24	*	131 2 3306 31307	Panel Rear
25		131 2 4107 10200	Pulley (Small)
26		131 2 4107 10300	Pulley (Large)
27		131 2 4108 11200	Spindle Pulley
28		131 2 4111 00400	Spring Rope
29		131 2 4112 10200	Dial Rope
30		131 2 5205 15300	Cushion
31		131 2 6111 14200	Bushing
32		131 2 6113 36800	Shelter
33		131 2 6201 28301	Plate Heat Sink
34		131 2 7104 00500	Plate Pad Switch
35		131 2 4201 17800	Screw (GND)

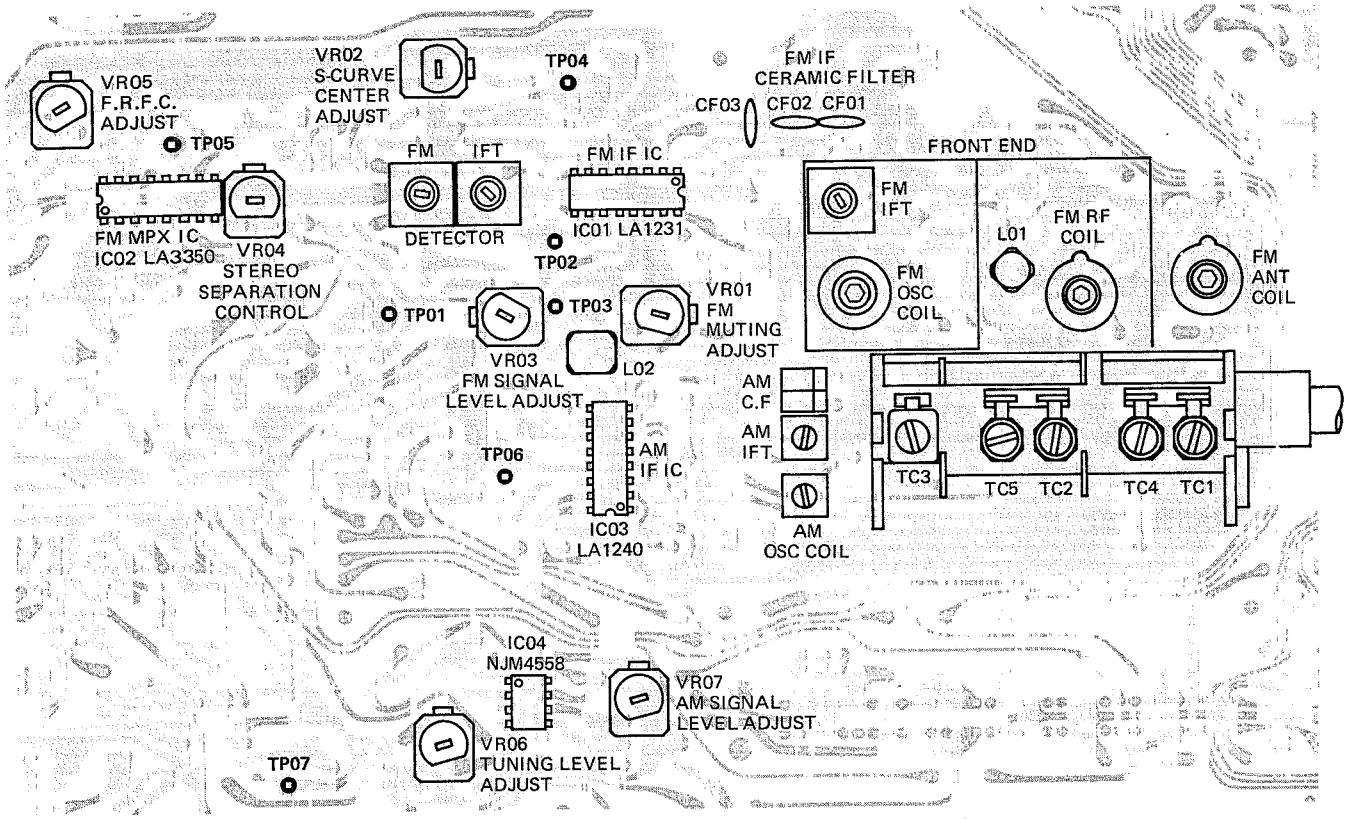
ELECTRICAL PARTS LIST

Ref. No.		Parts Number	Description
40		4 2312 01020	Switch Slide
41		4 2312 03890	Switch Rotary 0-5
42		4 2312 03891	Joint Switch
43		4 2372 00780	Terminal 4P (Antenna)
44		4 2379 21560	Terminal 8P (Speaker)
45		4 2432 00140	Power Cord
46		4 2512 12920	Power Transformer
47		4 2579 25201	Bar Antenna MW
48		4 2599 20300	Balun
49	*	131 0 4001 05351	RF IF Main P.C.B. Assy
50	*	131 0 4001 05361	Tuning Ind. P.C.B. Assy
51	*	131 0 4001 05371	Pointer Ind. P.C.B. Assy
52	*	131 0 4001 05381	Power Supply P.C.B. Assy
53	*	131 0 4001 05391	Speaker Switch P.C.B. Assy
54	*	131 0 4001 06010	Power Switch P.C.B. Assy
55	*	131 0 4001 05411	Pre Amp P.C.B. Assy
56	*	131 0 4001 05460	DIN Connector P.C.B. Assy
C01		C1HYDZ473A	Ceramic 0.047 μF 50V +80,–20%
R01		R3AXPK222A	Oxide Metal Film 2.2k 1W ±10%

*—Not a service part.

AM-FM BOARD LAYOUT

(TOP VIEW)



AM TUNER ALIGNMENT

Maintain generator output as low as possible for suitable indications.

ITEM	GENERATOR	AM DIAL SETTING	INDICATOR	PROCEDURE
1. IF ALIGN-MENT	Connect 455 kHz sweep generator to VC5 and ground lead to chassis. Use 0.1 μF capacitor in series with generator lead.	Position of non-interference near 1400 kHz	Scope vertical input to TP6 and ground lead to chassis.	Adjust AM IFT (2-00040) for maximum gain and best symmetry. Keep signal low enough for noise on response.
2. FRONT END ALIGN-MENT (600 kHz)	AM generator to EXT AM ANT and GND ter-minals. Set to 600 kHz. Modu-late with 400 Hz (30% modulation).	Center of 600 kHz calibration mark on dial	Scope vertical input to TAPE Rec Out jack.	Adjust AM OSC (2-00020) and AM ANTENNA for maximum gain.
3. FRONT END ALIGN-MENT (1400 kHz)	Change generator setting to 1400 kHz.	Center of 1400 kHz calibration mark on dial	Same as above	Adjust TC04 and TC05 for maximum gain. Repeat steps 2 and 3 until optimum alignment is reached.
4. SIGNAL LED ADJUST-MENT	Change generator setting to 1000 kHz.	Center of 1000 kHz calibration mark on dial	Front panel SIGNAL LED display	Adjust VR07 until the fifth signal LED partly lights up.

FM TUNER ALIGNMENT

Maintain generator output as low as possible for suitable indications.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
NOTE: The FM IF circuit utilizes a non-turnable ceramic filter which establishes the IF bandpass. To insure symmetrical tuning and selectivity, the IF must be aligned precisely to the center of the filter bandpass, rather than to 10.7 MHz as in conventional LC circuits.				
1. IF ALIGNMENT	Connect 10.7 MHz Sweep Generator to VC2 and, ground lead to chassis.	Position of non-interference Minimum frequency	Scope vertical input to TP3, and connect ground lead to chassis.	Adjust FM IFT (9-21360) for maximum gain and best symmetry.
2. PRELIMINARY DETECTOR ALIGNMENT	Generator connections are the same as above. Adjust for S-curve display. Set generator output to 60 dB.	Position of non-interference	Scope vertical input to TP4.	Adjust FM DET (RIGHT COIL) for maximum gain and best linearity. Adjust FM DET (LEFT COIL) for minimum gain and best linearity.
3. S-CURVE CENTER ALIGNMENT			Connect DC VTVM across TP1 and TP2.	Adjust VR02 until VTVM reads 0 V.
4. TUNING LED ADJUSTMENT		Position of non-interference	Connect DC VTVM across TP7 and ground.	Adjust VR06 until VTVM reads 0 V±50 mV.
5. SIGNAL LED ADJUSTMENT	Connect FM RF generator through FM Dummy ANTENNA to FM ANTENNA terminals. Set generator to 98 MHz. (43 dB)	Center of 98 MHz calibration mark on dial	Front panel SIGNAL LED display	Adjust VR03 until the fifth signal LED partly lights up.
NOTE: Confirm that all signal LED light up brightly when the antenna input is increased to 100 dB. Then, set the input in no-signal mode and confirm that all LED are extinguished in all bands. Perform this adjustment after AM Signal LED Adjustment.				
6. FM MUTING LEVEL ADJUSTMENT	Set generator to 98 MHz. Adjust ATT output for 8 μV. (18 dB).	Same as above	Scope vertical input to TAPE Rec Out jack.	Set Function Switch to FM AUTO and adjust VR01 until the received wave form becomes half of the maximum form.
NOTE: Decrease the output level of ATT and confirm that the wave form disappears. Increase the output level of ATT again and confirm that the input level meets the specification sufficiently when the wave form has appeared.				
NOTE: Connect 120-ohm composition resistors in series with each lead from the RF generator to match the 50-ohm output to the 300-ohm input impedance. Generator output voltage is reduced to one-half at antenna terminals. Signal voltages specified in this table are generator output levels, *not* antenna voltages.				
7. FRONT END ALIGNMENT		Tuning knob fully counterclockwise		Place center of dial pointer on "0" (zero) and secure pointer with bonding material.
8. FRONT END ALIGNMENT (90 MHz)	Connect FM RF generator through 120 ohm resistors to FM ANT terminals. Set to 90 MHz.	Center of 90 MHz calibration mark on dial	Scope vertical input to TAPE Rec Out jack.	Adjust ANT COIL, RF COIL and OSC COIL, for maximum gain.
9. (106 MHz)	Change ganerator setting to 106 MHz.	Center of 106 MHz calibration mark on dial	Same as above	Adjust TC3, TC2 and TC1 for maximum gain and minimum harmonic distortion.

FM TUNER ALIGNMENT

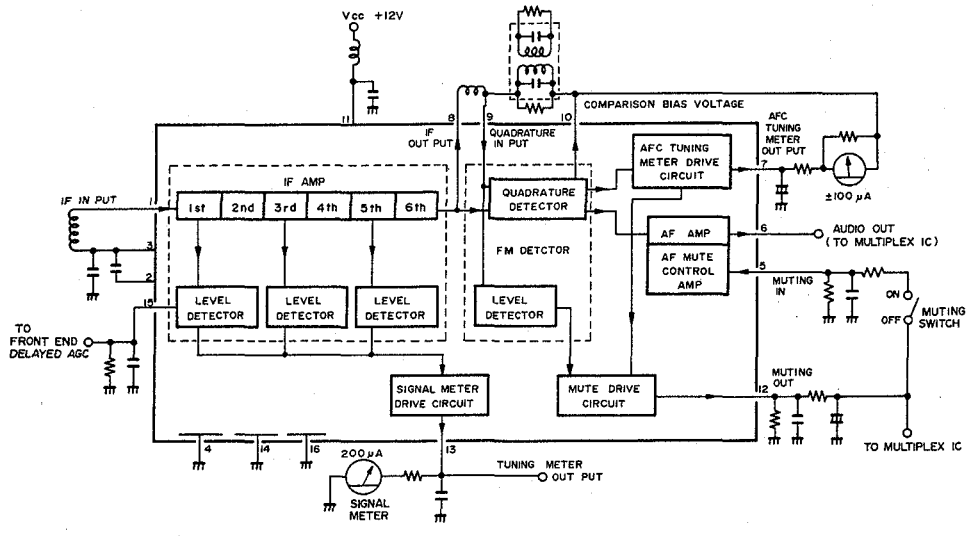
–Continued–

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
10. FINAL DETECTOR ALIGN-MENT (MINIMUM THD)	Set generator to receiver frequency. Modulate with 1 kHz ±75 kHz deviation. Connect generator to FM ANT terminals.	Tune receiver to position of non-interference.	Connect DC VTVM across TP1 and TP2.	Reduce generator output for noise to be visible on sine wave. Readjust generator frequency to center noise on positive and negative half cycles. Adjust VR02 until VTVM reads 0 V.
11. PLL IC FREE RUN FREQ. CONT. ADJUST-MENT	Same as above Increase generator output.	Same as above	Connect fre-quency counter through TP5.	Adjust VR05 in multiplex circuit to obtain 19 kHz±200 Hz on counter.
12. FM STEREO SIGNAL SEPARATION CONTROL	Connect FM stereo SG to FM ANT terminals. 19 kHz sig-nal ON. Main channel, sub channel signal ON. Apply 1000 Hz signal from L Ch.		Scope and AC-VTVM to RIGHT TAPE output jack.	Adjust VR04 for minimum output.
	Same as above for RIGHT channel.		Scope and AC-VTVM to LEFT TAPE output jack.	

CAUTION: This precision high-fidelity instrument should be serviced only by qualified personnel, trained in the repair of transistor equipment and printed circuitry.

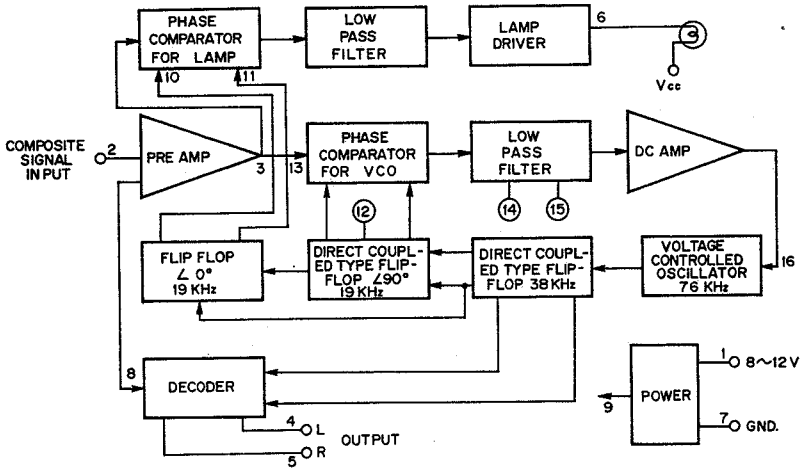
IC EQUIVALENT CIRCUIT & BLOCK DIAGRAM

FM IF IC LA1231

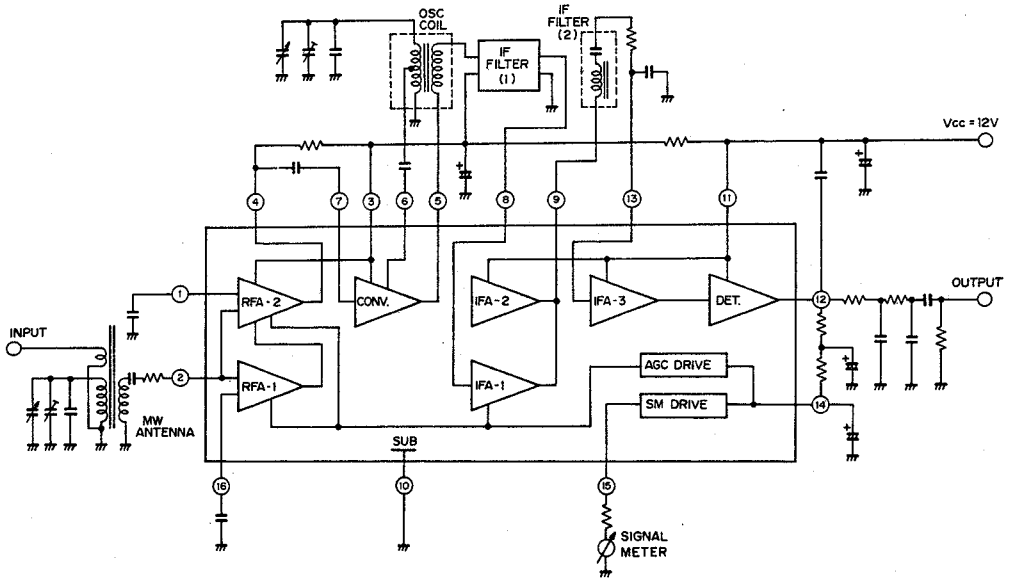


IC EQUIVALENT CIRCUIT & BLOCK DIAGRAM (Continued)

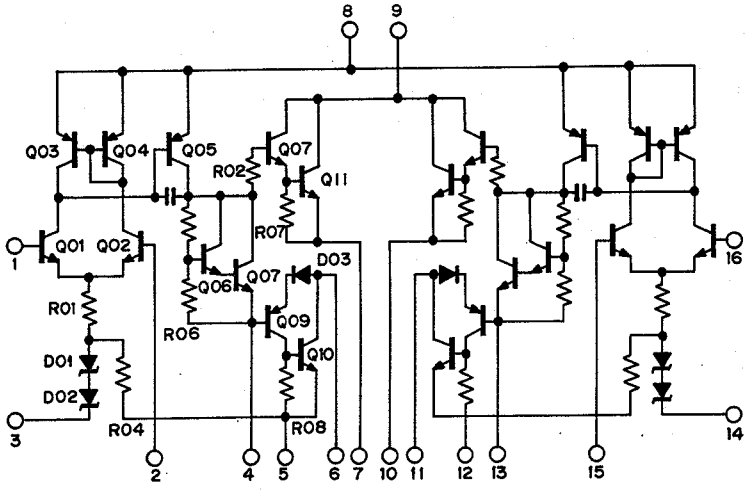
FM MULTIPLEX IC LA3350



AM RF IF IC LA1240

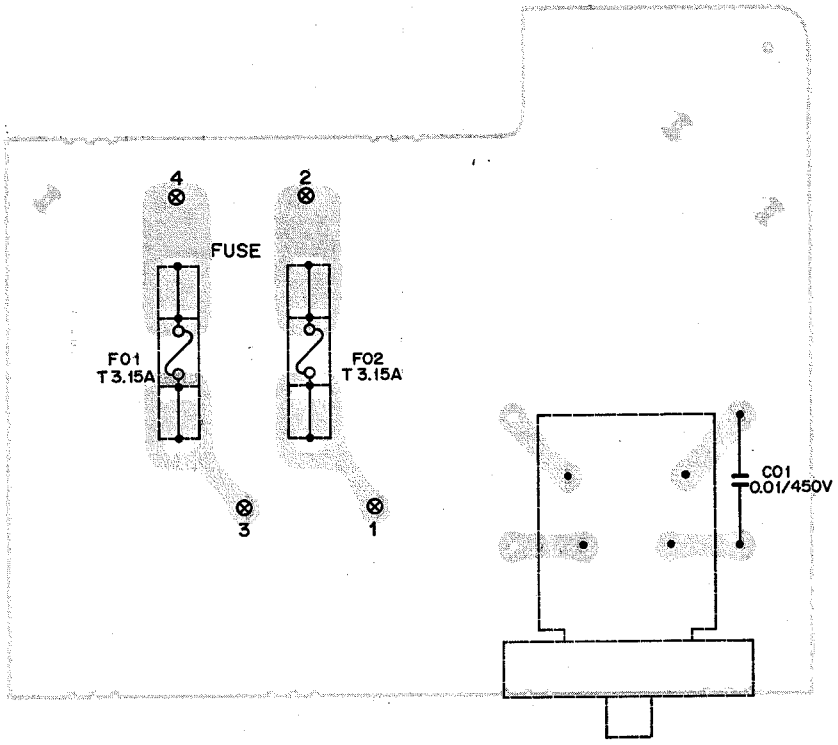


POWER AMP IC STK461SA



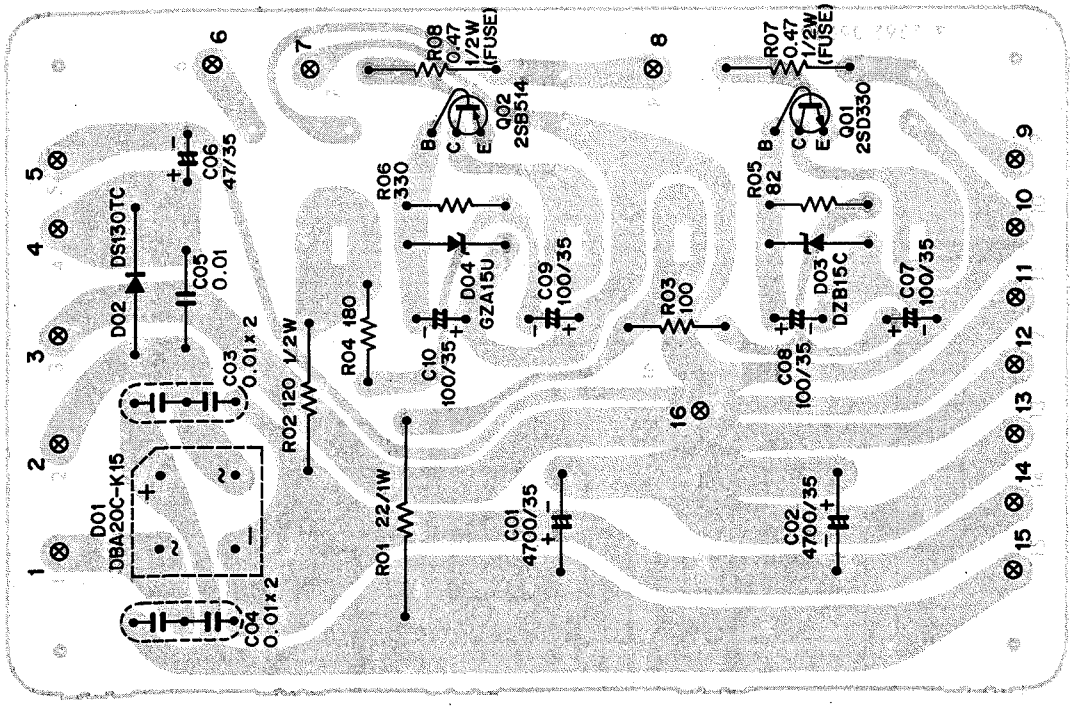
POWER SW P.C.BOARD

(BOTTOM VIEW)



POWER SUPPLY P.C.BOARD

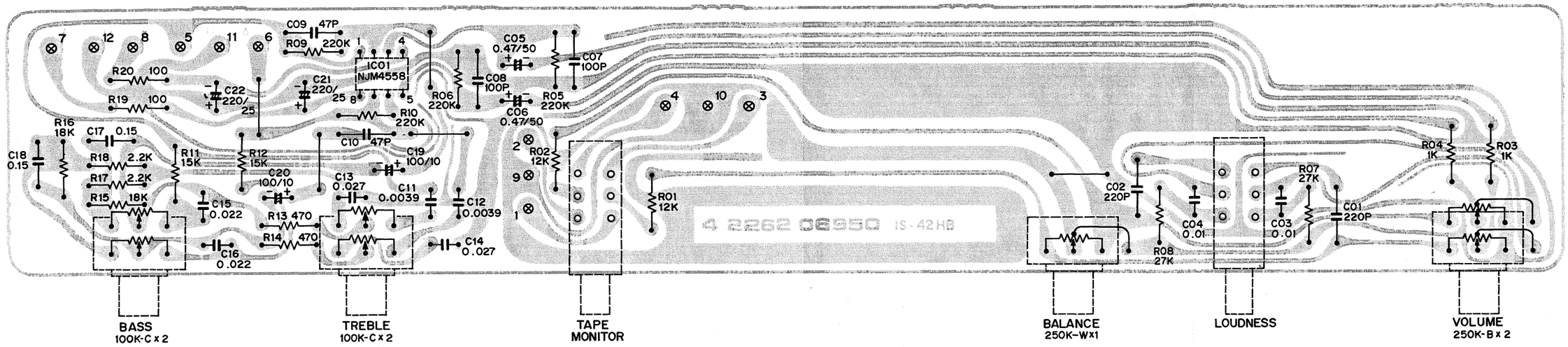
(BOTTOM VIEW)



TRANSISTOR DC VOLTAGES				
SYMBOL No.	DEVICE	B	C	E
Q01	2SD330	18.0V	27.2V	17.4V
Q02	2SB514	−15.4V	−23.8V	−14.8V

PRE AMPLIFIER PRINTED CIRCUIT BOARD

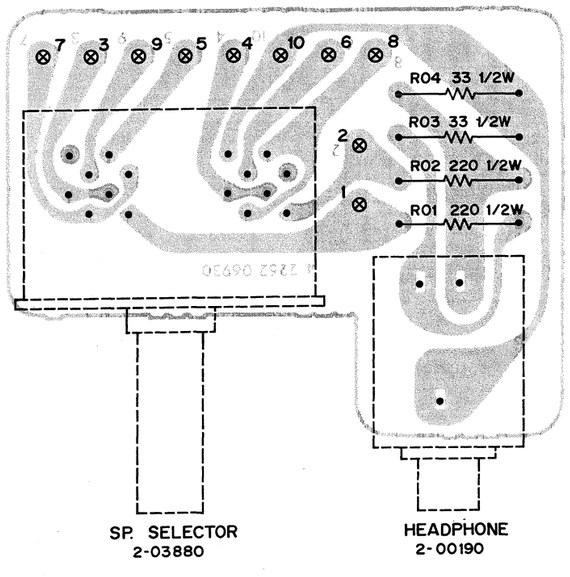
(BOTTOM VIEW)



IC PIN NUMBERS VOLTAGES									
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8
IC01	NJM4558	0.15mV	5.5mV	4.9mV	−13.9V	4.9mV	3.7mV	−1.43mV	15.0V

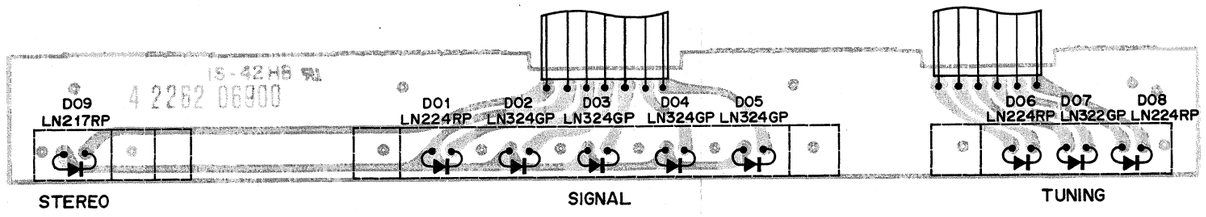
SPEAKER SWITCH P.C.BOARD

(BOTTOM VIEW)



TUNING INDICATOR P.C.BOARD

(BOTTOM VIEW)

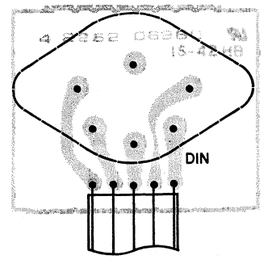


POINTER P.C.BOARD

(BOTTOM VIEW)

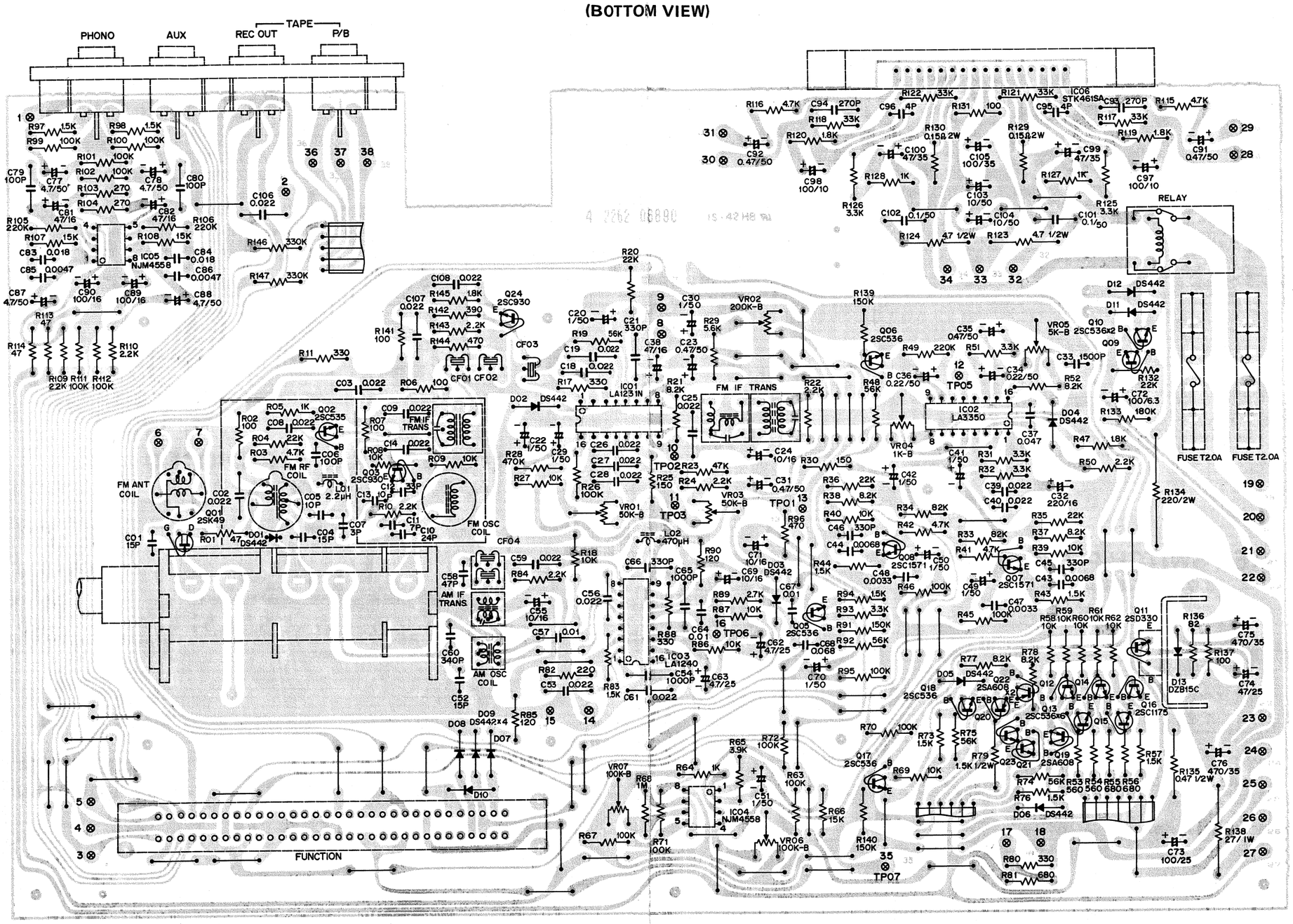
DIN CONNECTOR P.C.BOARD

(BOTTOM VIEW)



RF IF MAIN PRINTED CIRCUIT BOARD

(BOTTOM VIEW)



IC PIN NUMBERS VOLTAGES																	
SYMBOL No	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC01	LA1231	2.9V	2.9V	2.9V	0V	1.7V	5.8V	5.8V	5.7V	5.7V	5.7V	11.5V	3.5V	0.8V	0V	5.2V	0.7V
IC02	LA3350	12.1V	3.0V	5.7V	8.8V	8.9V	14.0V	0V	0.4V	6.5V	2.2V	2.18V	2.19V	2.18V	2.18V	2.18V	2.18V
IC03	LA1240	4.9V	1.78V	13.1V	10.9V	13.7V	3.5V	1.3V	2.8V	10.2V	0V	13.7V	1.62V	0.67V	1.6V	7.9mV	1.2V

IC PIN NUMBERS VOLTAGES									
SYMBOL No.	DIVICE	1	2	3	4	5	6	7	8
IC04	NJM4558	–0.53V	–52mV	–52mV	–14.5mV	17mV	18mV	0.57V	14.5V
IC05	NJM4558	–2.2mV	48mV	2.4mV	–14.3V	2.3mV	45mV	44mV	14.5V

PARTS LIST

RF IF MAIN P.C.B. Assy
131 0 4001 05351

Ref. No.	Parts Number	Description
	4 2249 20530	Variable Capacitor
	4 2272 00030	Ceramic Filter (454.5 kHz)
	4 2322 00160	Relay
F01,02	4 2349 20250	Fuse T2.0 A (Protector)
	4 2352 00200	Fuse Clip
	4 2359 23180	Socket 4P
	4 2562 00040	IF Transformer AM
	4 2562 00240	IF Transformer FM
	4 2562 00250	IF Transformer FM
	4 2569 21360	IF Transformer FM
	4 2579 21180	Antenna Coil FM
	4 2582 00020	OSC Coil AM
	4 2589 20910	OSC Coil FM
	4 2599 20460	RF Coil FM
L01	4 2532 00010	Choke Coil 2.2 μH
L02	4 2532 00020	Choke Coil 470 μH
S03	4 2312 03900	Slide Switch 8-6
VR01	4 2222 01010	VR 50k-B (Muting Adjust)
VR02	4 2222 01020	VR 200k-B (S-Curve Adjust)
VR03	4 2222 01010	VR 50k-B (Signal Level)
VR04	4 2222 00990	VR 1k-B (Stereo Separation)
VR05	4 2222 01000	VR 5k-B (Free Run Adjust)
VR06	4 2222 00960	VR 100k-B (Tuning Level)
VR07	4 2222 00960	VR 100k-B (AM Signal Level)
	131 2 6201 28000	Plate Heat Sink
CF01,02 03	4 2272 00020	Ceramic Filter (10.7 MHz)

CAPACITORS

C01	C1HCDJ150SL	Ceramic	15 pF	50V	±5%
C02,03	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C04	C1HCDJ150SL	Ceramic	15 pF	50V	±5%
C05	C1HCDD100SL	Ceramic	10 pF	50V	±0.5%
C06	C1HCDK101SL	Ceramic	100 pF	50V	±10%
C07	C1HCDC030SL	Ceramic	3 pF	50V	±0.25%
C08,09	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C10	C1HCDK240RH	Ceramic	24 pF	50V	±10%
C11	C1HCDD070CH	Ceramic	7 pF	50V	±0.5%
C12	C1HCDK330CH	Ceramic	33 pF	50V	±10%
C13	C1HCDD100CH	Ceramic	10 pF	50V	±0.5%
C14,18 19	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C20	C1HRY-105APA	Electrolytic	1 μF	50V	
C21	C1HCZK331BPA	Ceramic	330 pF	50V	±10%
C22	C1HRY-105APA	Electrolytic	1 μF	50V	
C23	C1HRY-474APA	Electrolytic	0.47 μF	50V	
C24	C1CRY-106APA	Electrolytic	10 μF	16V	
C25,26 27,28	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C29,30	C1HRY-105APA	Electrolytic	1 μF	50V	
C31	C1HRY-474APA	Electrolytic	0.47 μF	50V	
C32	C1CRE-227A	Electrolytic	220 μF	16V	
C33	C1HSEJ152A	Styrol	1500 pF	50V	±5%
C34	C1HRY-224LPA	Electrolytic	0.22 μF	50V	
C35	C1HRY-474LPA	Electrolytic	0.47 μF	50V	
C36	C1HRY-224LPA	Electrolytic	0.22 μF	50V	
C37	C1HFYK473APA	Mylar	0.047 μF	50V	±10%
C38	C1CRY-476APA	Electrolytic	47 μF	16V	
C39	C1HFRK223A	Mylar	0.022 μF	50V	±10%
C40	C1HFYK223APA	Mylar	0.022 μF	50V	±10%
C41,42	C1HRY-105APA	Electrolytic	1 μF	50V	
C43,44	C1HFRK682A	Mylar	0.0068 μF	50V	±10%
C45,46	C1HCYK331APA	Ceramic	330 pF	50V	±10%
C47,48	C1HFRK182A	Mylar	0.0018 μF	50V	±10%
C49,50 51	C1HRY-105APA	Electrolytic	1 μF	50V	
C52	C1HCDJ150WK	Ceramic	15 pF	50V	±5%
C53	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C54	C1HCZM102DPA	Ceramic	1000 pF	50V	±20%
C55	C1CRY-106APA	Electrolytic	10 μF	16V	
C56	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C57	C1ECZN103XPA	Ceramic	10000 pF	25V	±20%
C58	C1HCYK470APA	Ceramic	47 pF	50V	±10%
C59	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C60	C1HSEJ341A	Styrol	340 pF	50V	±5%
C61	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%
C62,63	C1ERY-475APA	Electrolytic	4.7 μF	25V	
C64	C1HFYK103APA	Mylar	0.01 μF	50V	±10%
C65	C1HCZM102DPA	Ceramic	1000 pF	50V	±20%
C66	C1HCZK331BPA	Ceramic	330 pF	50V	±10%
C67	C1HFYK103APA	Mylar	0.01 μF	50V	±10%
C68	C1HFRK683A	Mylar	0.068 μF	50V	±10%
C69	C1CRY-106APA	Electrolytic	10 μF	16V	
C70	C1HRY-105APA	Electrolytic	1 μF	50V	
C71	C1CRY-106APA	Electrolytic	10 μF	16V	
C72	C0JRY-107APA	Electrolytic	100 μF	6.3V	
C73	C1ERY-107APA	Electrolytic	100 μF	25V	
C74	C1ERY-476APA	Electrolytic	47 μF	25V	
C75,76	C1VRE-477A	Electrolytic	470 μF	35V	
C77,78	C1HRY-475APA	Electrolytic	4.7 μF	50V	
C79,80	C1HCZJ101SPA	Ceramic	100 pF	50V	±5%
C81,82	C1CRY-476APA	Electrolytic	47 μF	16V	
C83,84	C1HFYK183APA	Mylar	0.018 μF	50V	±10%
C85,86	C1HFRK472A	Mylar	0.0047 μF	50V	±10%
C87,88	C1HRY-475APA	Electrolytic	4.7 μF	50V	
C89	C1CRY-107APA	Electrolytic	100 μF	16V	
C90	C1CRE-107A	Electrolytic	100 μF	16V	
C91,92	C1HRY-474APA	Electrolytic	0.47 μF	50V	
C93,94	C1HCZK271BPA	Ceramic	270 pF	50V	±10%
C95,96	C1HCDC040SL	Ceramic	4 pF	50V	±0.25%
C97,98	C1ARY-107APA	Electrolytic	100 μF	10V	
C99,100	C1VRY-476APA	Electrolytic	47 μF	35V	
C101,102	C1HFRM104A	Mylar	0.1 μF	50V	±20%
C103,104	C1HRY-106APA	Electrolytic	10 μF	50V	
C105	C1VRE-107A	Electrolytic	100 μF	35V	
C106,107 108	C1CCZN223YPA	Ceramic	0.022 μF	16V	±30%

PARTS LIST (Continued)

Ref. No.	Parts Number	Description
	SEMICONDUCTORS	
D01,02 03,04 05,06 07,08 09,10 11,12	205 5 9040 44210	Diode, DS-442
D13	202 5 3230 15020	Zenner Diode, DZB15C
IC01	206 5 0161 23151	IC, LA1231NS
IC02	206 5 0743 35012	IC, LA3350B
IC03	206 5 0171 24010	IC, LA1240
IC04,05	IJJ-NJM4558DX	IC, NJM4558DX
IC06	206 5 7340 46170	IC, STK-461SA (Power Amp)
Q01	TNN-2SK49--F2	TR 2SK49 F, H
Q02	TKK-2SC535--B	TR 2SC535 B, C
Q03	203 5 5500 93040	TR 2SC930 D, E
Q05,06	203 5 5000 53660	TR 2SC536 F, G
Q07,08	203 5 5251 57170	TR 2SC1571 G, H
Q09,10	203 5 5000 53660	TR 2SC536 F, G
Q11	203 5 8570 33050	TR 2SD330 E, F
Q12,13 14,15	203 5 5000 53660	TR 2SC536 F, G
Q16	203 5 6711 17560	TR 2SC1175 F, G
Q17,18	203 5 5000 53660	TR 2SC536 F, G
Q19,20	203 5 7230 60860	TR 2SA608 F, G
Q21	203 5 5000 53660	TR 2SC536 F, G
Q22	203 5 7230 60860	TR 2SA608 F, G
Q23	203 5 5000 53660	TR 2SC536 F, G
Q24	203 5 5500 93040	TR 2SC930 D, E

RESISTORS

R01	R2EDZJ470APA	Carbon	47	1/4W	±5%
R02	R2EDZJ101APA	Carbon	100	1/4W	±5%
R03	R2EDZJ472APA	Carbon	4.7k	1/4W	±5%
R04	R2EDZJ223APA	Carbon	22k	1/4W	±5%
R05	R2EDZJ102APA	Carbon	1k	1/4W	±5%
R06,07	R2EDZJ101APA	Carbon	100	1/4W	±5%
R08,09	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R10	R2EDZJ222APA	Carbon	2.2k	1/4W	±5%
R11	R2EDZJ331APA	Carbon	330	1/4W	±5%
R17	R2EDZJ331APA	Carbon	330	1/4W	±5%
R18	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R19	R2EDZJ563APA	Carbon	56k	1/4W	±5%
R20	R2EDZJ223APA	Carbon	22k	1/4W	±5%
R21	R2EDZJ822APA	Carbon	8.2k	1/4W	±5%
R22	R2EDZJ222APA	Carbon	2.2k	1/4W	±5%
R23	R2EDZJ473APA	Carbon	47k	1/4W	±5%
R24	R2EDZJ222APA	Carbon	2.2k	1/4W	±5%
R25	R2EDPJ151A	Carbon	150	1/4W	±5%
R26	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R27	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R28	R2EDZJ474APA	Carbon	470k	1/4W	±5%
R29	R2EDZJ562APA	Carbon	5.6k	1/4W	±5%
R30	R2EDPJ151A	Carbon	150	1/4W	±5%
R31,32	R2EDZJ332APA	Carbon	3.3k	1/4W	±5%
R33,34	R2EDZJ823APA	Carbon	82k	1/4W	±5%
R35,36	R2EDZJ153APA	Carbon	15k	1/4W	±5%
R37,38	R2EDZJ822APA	Carbon	8.2k	1/4W	±5%
R39,40	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R41,42	R2EDZJ822APA	Carbon	8.2k	1/4W	±5%
R43,44	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R45,46	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R47	R2EDZJ182APA	Carbon	1.8k	1/4W	±5%
R48	R2EDZJ563APA	Carbon	56k	1/4W	±5%
R49	R2EDZJ224APA	Carbon	220k	1/4W	±5%
R50	R2EDZJ222APA	Carbon	2.2k	1/4W	±5%
R51	R2EDZJ332APA	Carbon	3.3k	1/4W	±5%
R52	R2EDZJ822APA	Carbon	8.2k	1/4W	±5%
R53,54	R2EDZJ561APA	Carbon	560	1/4W	±5%
R55,56	R2EDZJ681APA	Carbon	680	1/4W	±5%
R57	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R58,59 60,61 62	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R63	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R64	R2EDZJ102APA	Carbon	1k	1/4W	±5%
R65	R2EDZJ392APA	Carbon	3.9k	1/4W	±5%
R66	R2EDZJ153APA	Carbon	15k	1/4W	±5%
R67	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R68	R2EDZJ105APA	Carbon	1M	1/4W	±5%
R69	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R70,71 72	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R73	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R74,75	R2EDZJ563APA	Carbon	56k	1/4W	±5%
R76	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R77,78	R2EDZJ822APA	Carbon	8.2k	1/4W	±5%
R79	R2HXBJ152A	Oxide Metal Film	1.5k	1/2W	±5%
R80	R2EDZJ331APA	Carbon	330	1/4W	±5%
R81	R2EDZJ681APA	Carbon	680	1/4W	±5%
R82	R2EDZJ221APA	Carbon	220	1/4W	±5%
R83	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R84	R2EDZJ222APA	Carbon	2.2k	1/4W	±5%
R85	R2EDPJ121A	Carbon	120	1/4W	±5%
R86,87	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R88	R2EDZJ331APA	Carbon	330	1/4W	±5%
R89	R2EDZJ272APA	Carbon	2.7k	1/4W	±5%
R90	R2EDPJ121A	Carbon	120	1/4W	±5%
R91	R2EDZJ154APA	Carbon	150k	1/4W	±5%
R92	R2EDZJ563APA	Carbon	56k	1/4W	±5%
R93	R2EDZJ332APA	Carbon	3.3k	1/4W	±5%
R94	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R95	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R96	R2EDPJ471A	Carbon	470	1/4W	±5%
R97,98	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R99,100 101,102	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R103,104	R2EDZJ271APA	Carbon	270	1/4W	±5%
R105,106	R2EDZJ224APA	Carbon	220k	1/4W	±5%
R107,108	R2EDZJ153APA	Carbon	15k	1/4W	±5%
R109,110	R2EDZJ222APA	Carbon	2.2k	1/4W	±5%
R111,112	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R113,114	R2EDPJ470A	Carbon	47	1/4W	±5%
R115,116	R2EDZJ472APA	Carbon	4.7k	1/4W	±5%
R117,118	R2EDZJ333APA	Carbon	33k	1/4W	±5%
R119,120	R2EDZJ182APA	Carbon	1.8k	1/4W	±5%
R121,122	R2EDPJ333A	Carbon	33k	1/4W	±5%

PARTS LIST (Continued)

TUNING IND. P.C.B. Assy
131 0 4001 05361

Ref. No.	Parts Number	Description
		RESISTORS
R123,124	R2HXBJ4R7A	Oxide Metal Film 4.7 1/2W ±5%
R125,126	R2EDZJ332APA	Carbon 3.3k 1/4W ±5%
R127,128	R2EDPJ102A	Carbon 1k 1/4W ±5%
R129,130	4 2212 00140	Metallized Paper 0.15 ohm 2W
R131	R2EDPJ101A	Carbon 100 1/4W ±5%
R132	R2EDZJ223APA	Carbon 22k 1/4W ±5%
R133	R2EDZJ184APA	Carbon 180k 1/4W ±5%
R134	R3DXBJ221A	Oxide Metal Film 220 2W ±5%
R135	R2HZPKR47A	Fuse 0.47 1/2W ±10%
R136	R2EDPJ820A	Carbon 82 1/4W ±5%
R137	R2EDPJ101A	Carbon 100 1/4W ±5%
R138	R3AXBJ270A	Oxide Metal Film 27 1W ±5%
R139,140	R2EDZJ154APA	Carbon 150k 1/4W ±5%
R141	R2EDZJ101APA	Carbon 100 1/4W ±5%
R142	R2EDZJ391APA	Carbon 390 1/4W ±5%
R143	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R144	R2EDZJ471APA	Carbon 470 1/4W ±5%
R145	R2EDZJ182APA	Carbon 1.8k 1/4W ±5%
R146,147	R2EDZJ334APA	Carbon 330k 1/4W ±5%
R148,149	R2EDZJ103APA	Carbon 10k 1/4W ±5%

Ref. No.	Parts Number	Description
	131 2 4208 33100	Spacer
	131 2 4208 33200	Spacer
	131 2 4208 33300	Spacer
	131 2 5205 23500	Cushion
		SEMICONDUCTORS
D01	DWW-LN224RP	LED LN224RP (Red)
D02,03 04,05	DWW-LN324GP	LED LN324GP (Green)
D06	DWW-LN224RP	LED LN224RP (Red)
D07	DWW-LN322GP	LED LN322GP (Green)
D08	DWW-LN224RP	LED LN224RP (Red)
D09	DWW-LN217RP	LED LN217RP (Red)

POINTER IND. P.C.B. Assy
131 0 4001 05371

Ref. No.	Parts Number	Description
		SEMICONDUCTORS
D01	DTT-TLG205	LED TLG205 (Green)

POWER SUPPLY P.C.B. Assy
131 0 4001 05381

Ref. No.	Parts Number	Description
	131 2 6201 21500	Plate Heat Sink
		CAPACITORS
C01,02	4 2232 00480	Electrolytic 4700 µF 35V
C03,04	4 2232 00430	Ceramic 0.01 µFx2 250V
C05	C2HYDP103A	Ceramic 0.01 µF 500V +100,—0%
C06	C1VRE-476A	Electrolytic 47 µF 35V
C07,08 09,10	C1VRE-107A	Electrolytic 100 µF 35V
		SEMICONDUCTORS
D01	202 5 2570 02015	Bridge Diode, DBA 20C-K15
D02	202 5 2440 13030	Diode, DS-130TC
D03	202 5 3230 15020	Zenner Diode, DZB15C
D04	202 5 3210 15020	Zenner Diode, GZA15U
Q01	203 5 8570 33060	TR 2SD330 F
Q02	203 5 8530 51460	TR 2SB514 F
		RESISTORS
R01	R3AXBJ220A	Oxide Metal Film 22 1W ±5%
R02	R2HXBJ121A	Oxide Metal Film 120 1/2W ±5%
R03	R2EDPJ101A	Carbon 100 1/4W ±5%
R04	R2EDPJ181A	Carbon 180 1/4W ±5%
R05	R2EDPJ820A	Carbon 82 1/4W ±5%
R06	R2EDPJ331A	Carbon 330 1/4W ±5%
R07,08	R2HZPKR47A	Fuse 0.47 1/2W ±10%

SPEAKER SWITCH P.C.B. Assy
131 0 4001 05391

Ref. No.	Parts Number	Description
	4 2352 00190	Microphone Jack 3P
S02	4 2312 03880	Rotary Switch
		RESISTORS
R01,02	R2HXBJ221A	Oxide Metal Film 220 1/2W ±5%
R03,04	R2HXBJ330A	Oxide Metal Film 33 1/2W ±5%

POWER SWITCH P.C.B. Assy
131 0 4001 06010

Ref. No.	Parts Number	Description
	4 2312 04200	Push Switch Power
F01,02	4 2349 20580	Fuse T3.15 A
	4 2352 00200	Fuse Clip
		CAPACITORS
C01	4 2232 00550	Oil Con. 0.01 µF 450V

PARTS LIST (Continued)

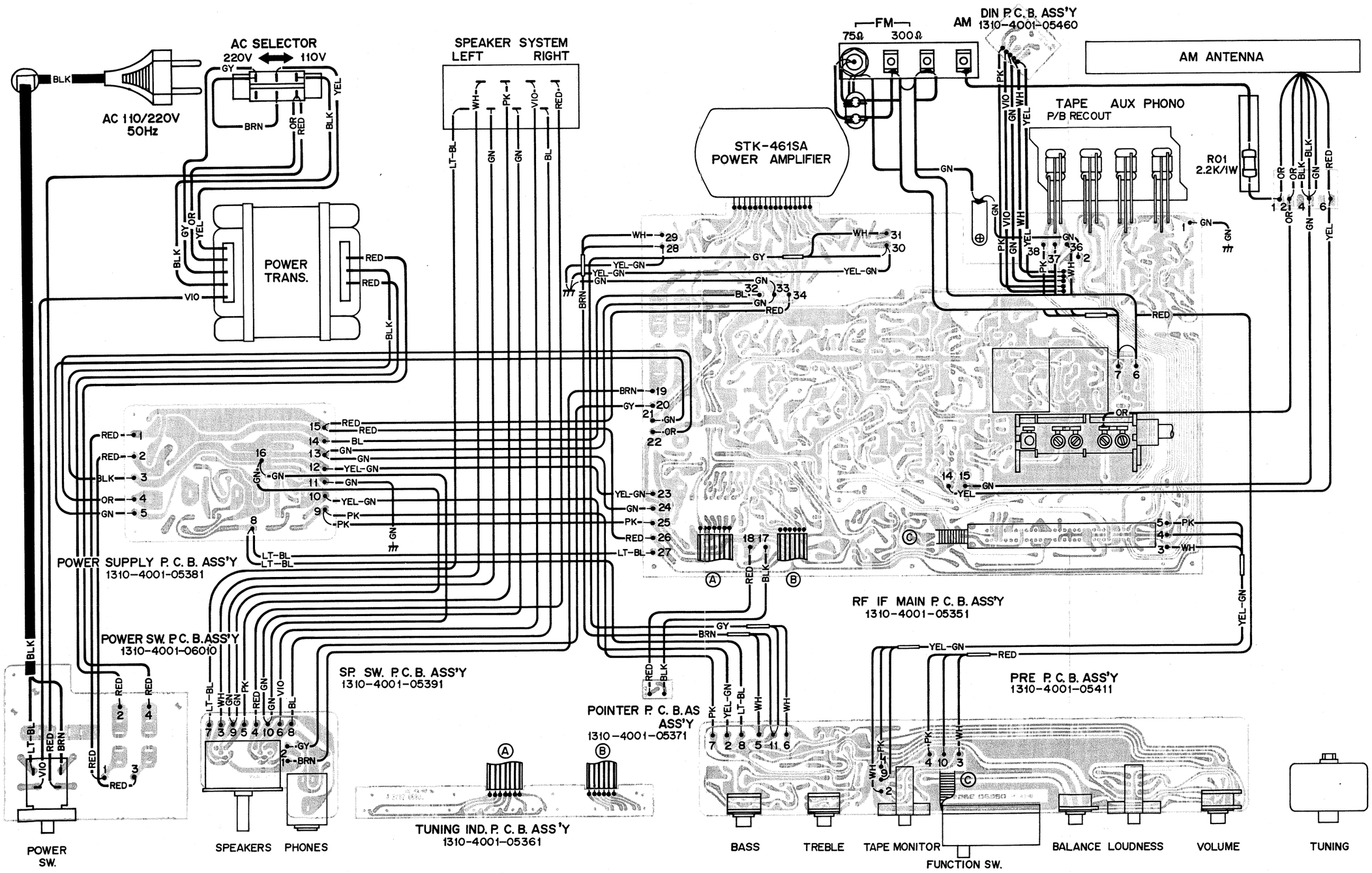
PRE AMP P.C.B. Assy
131 0 4001 05411

Ref. No.	Parts Number	Description
	4 2222 01430	VR 100k-Cx2 (Bass Treble)
	4 2222 01780	VR 250k-Bx2 (Volume)
	4 2222 01790	VR 250k-Wx1 (Balance)
	4 2312 03910	Push Switch 1 key
		CAPACITORS
C01,02	C1HCZK221BPA	Ceramic 220 pF 50V ±10%
C03,04	C1HFYK103APA	Mylar 0.01 µF 50V ±10%
C05,06	C1HRY-474APA	Electrolytic 0.47 µF 50V
C07,08	C1HCZJ101SPA	Ceramic 100 pF 50V ±5%
C09,10	C1HCZJ470SPA	Ceramic 47 pF 50V ±5%
C11,12	C1HFYK392APA	Mylar 0.0039 µF 50V ±10%
C13,14	C1HFRK273A	Mylar 0.027 µF 50V ±10%
C15	C1HFYK223APA	Mylar 0.022 µF 50V ±10%
C16	C1HFRK223A	Mylar 0.022 µF 50V ±10%
C17,18	C1HFRK154A	Mylar 0.15 µF 50V ±10%
C19,20	C1ARY-107APA	Electrolytic 100 µF 10V
C21,22	C1ERE-227A	Electrolytic 220 µF 25V
		SEMICONDUCTORS
IC01	IJJ-NJM4558DX	IC, NJM4558DX
		RESISTORS
R01,02	R2EDZJ123APA	Carbon 12k 1/4W ±5%
R03,04	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R05,06	R2EDZJ224APA	Carbon 220k 1/4W ±5%
R07,08	R2EDZJ273APA	Carbon 27k 1/4W ±5%
R09,10	R2EDZJ224APA	Carbon 220k 1/4W ±5%
R11,12	R2EDZJ153APA	Carbon 15k 1/4W ±5%
R13,14	R2EDZJ471APA	Carbon 470 1/4W ±5%
R15,16	R2EDZJ183APA	Carbon 18k 1/4W ±5%
R17,18	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R19,20	R2EDPJ101A	Carbon 100 1/4W ±5%

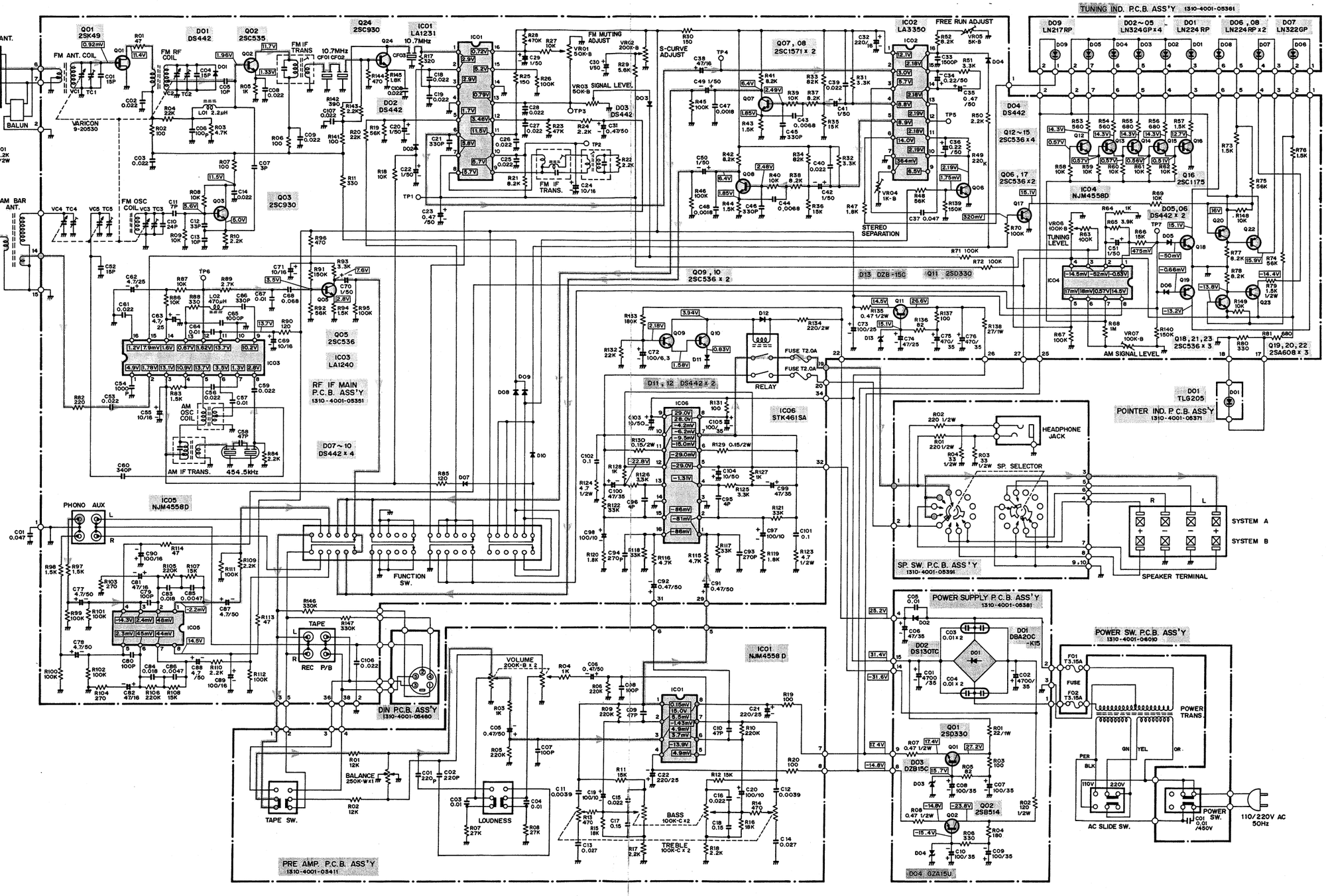
DIN CONNECTOR P.C.B. Assy
131 0 4001 05460

Ref. No.	Parts Number	Description
	4 2352 00370	DIN 5P (Tape)

POINT TO POINT WIRING DIAGRAM



SCHEMATIC DIAGRAM



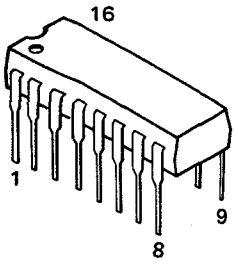
NOTES:

1. All resistors values are indicated in "ohm" (K=10^3, M=10^6).
2. All capacitors values are indicated in "μF" (P=10^{-12}).
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a V.T.V.M.
   b. All voltages ±10% with respect chassis ground
   c. No signals at input terminals
   d. AC input at 220 volts 50 Hz
4. This is a fundamental schematics diagram. Some products may be modified without notice.

SEMICONDUCTOR LEAD IDENTIFICATION

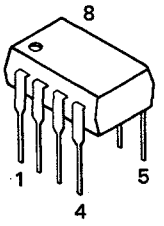
INTEGRATED CIRCUITS

AM/FM IF AMP & MPX P.L.L. IC



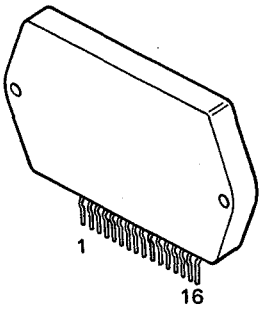
- LA1231
- LA3350
- LA1240

DC AMP IC



- NJM4558DX

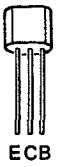
POWER AMP IC



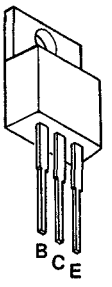
- STK-461SA

TRANSISTORS

- 2SK49

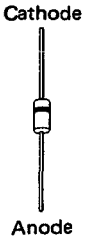


- 2SC930
- 2SC535
- 2SC536
- 2SC1571
- 2SC1175
- 2SA608

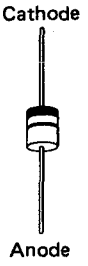


- 2SB514
- 2SD330

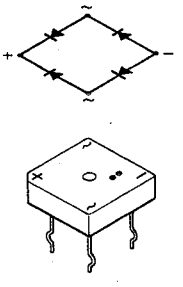
DIODES



- DS-442
- DZB15C
- GZA15U



- DS-130T



- DBA20C